

CopperLink™ Ethernet Extenders Product Guide



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CopperLink Ethernet Extenders

Ethernet is the most popular electronic communications medium in the world. Because it offers a versatile, low-cost, standards-based interface, Ethernet has become ubiquitous as the global technology-of-choice in industrial, enterprise, and carrier networks.

For all its benefits, Ethernet does present some limitations:

- **Cabling**—Standard Ethernet, runs over Cat 5 cabling infrastructure, the installation of which may be costly, and require (often more costly) network downtime.
- **Segmentation**—To avoid bottlenecks that cause network congestion, latency or even data loss, Ethernet LANs must be segmented, which increases network complexity, operational overhead, and cost.
- **Distance**—Perhaps the biggest drawback of Ethernet technology is the standard distance limitation of 328 feet (100 meters). In many applications it is impractical or impossible to install network-enabled devices within 328 feet from the nearest computer, router, or switch.

Despite the above limitations, the number of Ethernet-based installations continues to grow at an astounding rate.

Ethernet extension, which addresses the distance limitation of the Ethernet standard, can be found in these generalized applications:

- **M2M**—Interconnecting Ethernet terminals and devices

- **Ethernet access**—connecting users and devices to a central network

- **Ethernet networking**—interconnecting multiple users and servers

Patton's CopperLink™ Ethernet Extenders appear in a wide variety of environments, including business offices, mining tunnels, oil rigs and drills, manufacturing facilities, vehicular traffic management, security monitoring, maritime vessels, sporting arenas, nuclear power facilities, agriculture, and more!

Patton offers the industry's broadest range of products and solutions for leveraging existing copper or coaxial cabling infrastructure to extend Ethernet connections. CopperLink™ solutions can extend Ethernet segments over distances up to and exceeding 5 miles (8 km). The CopperLink™ product line supports line rates ranging from 192 kbps to 168 Mbps, and offers symmetric or asymmetric profiles. While most models operate over a single twisted pair, recently developed products deliver even greater bandwidth and longer distances by bonding up to four twisted pairs (8 wires) into a single Ethernet connection.

Perhaps best of all, Patton's CopperLink™ Ethernet Extenders are easy-to-use, plug-and-play devices, so users can bypass complex and tedious network configuration requirements. CopperLink™ Ethernet Extenders transparently pass all higher-layer protocols—including 802.1Q VLAN frames (tagged and untagged) and IP video compression schemes such as MPEG-4, H.264 and MJPEG.



CopperLink™ Model	Form Factor	Max. Speed	Distance at Max. Speed	Max. Distance	No. of Wires	Media Type	LAN Ports	Transmission Type	Page
2110	Desktop	10/100Base-TX	100 m (328 ft) per Model 2110	200 m 656 ft	2	Cat 5 or greater	2	N/A	6
2174	Desktop, Wall mountable	168 Mbps Downstream	76 m 250 ft	3 km (1.8 mi)	2	Twisted Pair, Coax	4	Symmetric, Asymmetric	7
2173	Desktop	100 Mbps Downstream	0.15 km 500 ft	1.3 km (4,250 ft)	2	Twisted Pair	2	Asymmetric	8
CL1314	Desktop, Wall mountable	5.7 Mbps	3.35 km (11,000 ft)	5.5 km (3.4 mi)	2	Twisted Pair	4	Symmetric	9
2151	Desktop	15 Mbps	1 km (3,000 ft)	1 km (3,000 ft)	2	Twisted Pair	2	Asymmetric	9
2150	Desktop	10 Mbps	1.1 km (3,750 ft)	1.1 km (3,750 ft)	2	Twisted Pair	2	Symmetric	10
2160 Series	Desktop	11.4 Mbps per pair	1.4 km (4,600 ft)	8.3 km (5.2 mi)	2 to 8	Twisted Pair (multiple)	4	Symmetric	11
2173R	Ruggedized, DIN/Wall mount	100 Mbps Downstream	0.15 km 500 ft	1.3 km (4,250 ft)	2	Twisted Pair	2	Asymmetric	12
CL1314R	Ruggedized, DIN/Wall mount	5.7 Mbps	3.35 km (11,000 ft)	5.5 km (3.4 mi)	2	Twisted Pair	4	Symmetric	12
2115	Desktop	N/A	N/A	4.6 km (2.8 mi)	2	Twisted Pair	1	T1	13
2113A	Desktop, Wall mountable	N/A	N/A	4.3 km (2.5 mi)	2	Twisted Pair	1	E1	13
CopperLink™ EnviroNET™ Ethernet Extender Solutions									14

Form Factors

Desktop

- ✓ Typically 0 to 50 °C
- ✓ New case can be wall mounted
- ✓ Controlled environment (not in the elements)



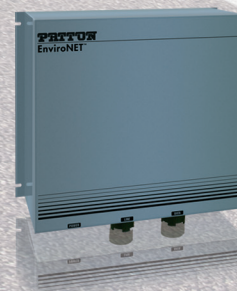
Ruggedized

- ✓ Temperature ranges from -10 to 70 °C, and from -40 to 85 °C
- ✓ DIN or wall mountable
- ✓ Controlled environment (not in the elements)



EnviroNET™

- ✓ Rated from -40 to 85 °C
- ✓ Pole or wall mountable
- ✓ Can be installed outdoors



Ethernet Extender Applications

Patton Solution: CopperLink™

Ethernet Connectivity (Machine-to-Machine)

Connecting Ethernet terminals/devices

- ✓ Connectivity is the linking of devices—M2M
- ✓ Today, many traditional RS-232 links are being replaced with Ethernet

Examples:

- Access Control and Card Reader Devices
- IP Cameras
- Traffic Control Signals
- Railway Communications



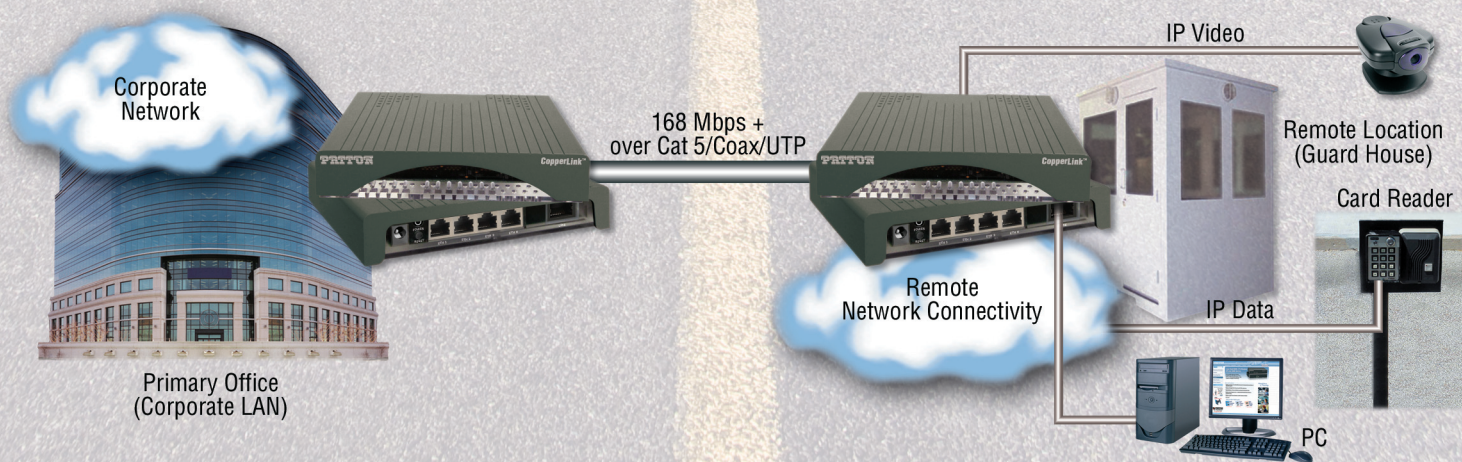
Ethernet Access (Person-to-Person)

Connecting remote users to a central network

- ✓ Access is connecting remote users and devices to a central network
- ✓ Usually a few remote devices or users need network access

Examples:

- Remote Utility Room
- Remote Control Room, Receiving Dock
- Caddy shack/Starters house



Ethernet Networking (LAN-to-LAN)

Connecting multiple users and servers

- ✓ Networking is connecting multiple users on each side of the connection to each other.
- ✓ An alternative to fiber or wireless while maintaining the lowest cost with copper

Examples:

- LAN extension to remote office
- High speed IP video delivery
- Campus building trunking
- Work groups



What CopperLink has to offer

- ✓ Devices that extend Ethernet beyond its 100-meter (328-foot) natural limitations
- ✓ Products sold in pairs (local and remote), so everything you need for installation is in the box. (Boosters don't work in pairs so they're sold individually)
- ✓ Pass Ethernet over multiple forms of media, not just Cat 5. Using your existing infrastructure decreases downtime and saves money.
- ✓ Transparent to higher-layer protocols and video schemes
- ✓ Ethernet bridge
- ✓ Plug-and-Play. Our Ethernet Extenders are so easy to use, they require no training and minimal technical support.



Ethernet Booster

Model 2110

The CopperLink™ 2110 solution more than doubles Ethernet and PoE distances over already existing network infrastructure cabling.

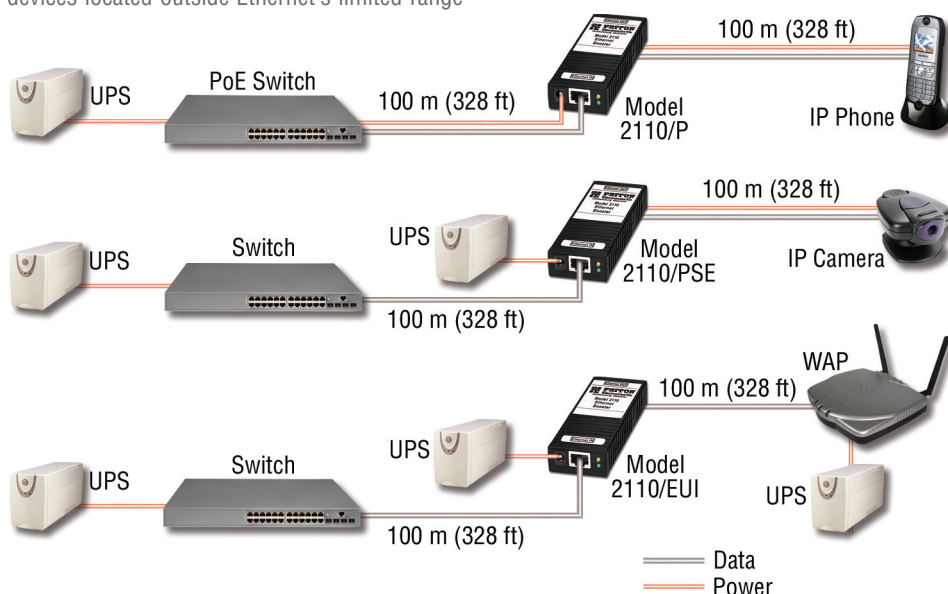
The CopperLink™ Model 2110 doubles Ethernet distance limitations of 328 feet (100 meters). Multiple Model 2110 Ethernet Boosters can be placed in-line to further extend both Ethernet and PoE up to 1,640 ft (500 m), eliminating the need for additional switches, hubs, wireless access points, and expensive fiber installations. The Model 2110 is completely transparent to protocol making them true plug-and-play

devices, completely interoperable with any network enabled device. The Model 2110 will not cause latency or degradation on your network connections, ensuring the maximum 100-Mbps full-duplex line rate. The Model 2110/P and 2110/PSE not only transparently pass on Ethernet data, but also feed on and forward PoE power to devices such as wireless access points, IP cameras, and VoIP phones.

Typical Applications

The CopperLink Ethernet Booster is ideal for delivering Ethernet to remote network enabled devices located outside Ethernet's limited range

of 328 feet (100 meters). Several configurations are possible based on individual requirements.



FEATURES & BENEFITS

- ✓ **Ethernet & PoE Extension**—Doubles 10/100Base-TX Ethernet and PoE to 200 meters (656 feet). Multiple units can be used in series for even longer extensions.
- ✓ **Operates over Cat 5**—Reduces the cost and hassles of adding switches, hubs, and wireless access points.
- ✓ **Plug and Play**—No configuration or cable hassles during installation with auto-sensing 10/100, full or half duplex, and automatic MDI-X.
- ✓ **Transparent LAN Operation**—Transparent operation ensures the highest rate possible for each extension distance.
- ✓ **No External Power Required**—Power over Ethernet (PoE) capability enables extenders and peripheral devices to be powered over standard twisted-pair Ethernet cable.

ORDERING INFORMATION

2110/EUI: CopperLink 10/100 Mbps Ethernet Booster; 100–240 VAC

2110/P: CopperLink 10/100 Mbps Ethernet Booster; 802.3af pass through

2110/PSE/EUI-48: CopperLink 10/100 Mbps Ethernet Booster and 802.3af PoE Injector; 48 VDC Source

802.3af Power and Distance Chart

	Power Delivered	13W	6.5W	3.84W	0W
	Class of PoE Device	Class 3/0	Class 2	Class 1	No PoE Load
Model	PoE Source	Maximum Distance (Quantity of Units)			
2110/P	3rd Party PoE switch	N/A	300 m / 984 ft (2 x 2110/P)	400 m / 1,310 ft (3 x 2110/P)	500 m / 1,640 ft (4 x 2110/P)
2110/PSE + 2110/P	PoE Injector 2110/PSE/EUI-48	300 m / 984 ft (1 x 2110/P)	400 m / 1,310 ft (2 x 2110/P)	500 m / 1,640 ft (3 x 2110/P)	600 m / 1,969 ft (4 x 2110/P)



168 Mbps Symmetrical Over Twisted-pair, Cat 5e/6/7 or Coaxial Cable Ethernet Extender

CopperLink™ 2174

Achieving symmetrical line rates greater than 168 Mbps over single twisted-pair, Cat 5e/6/7 or coaxial cable, Patton's CopperLink™ Model 2174 Ethernet Extender is the fastest CopperLink™ ever.

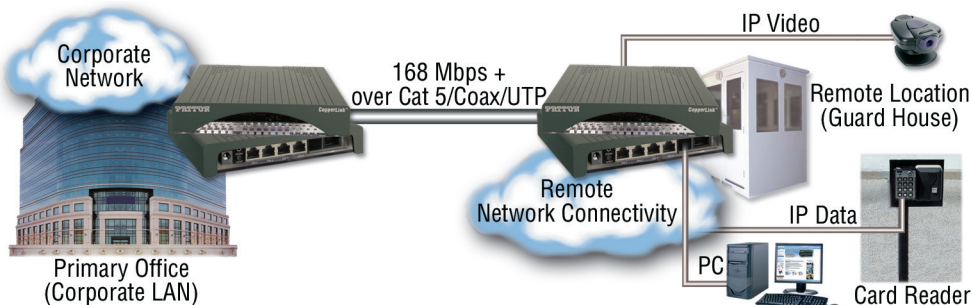
Perfect for bandwidth-intensive applications the Model 2174 delivers off-the-chart symmetrical line rates greater than 168 Mbps. Best of all—like all CopperLink™ products—the Model 2174 leverages existing copper infrastructure to deliver high speed Ethernet connectivity over single twisted-pair, Cat 5e/6/7 and—new to the CopperLink™ line—coaxial cabling.

Four user-selectable configuration profiles—combined with Patton's auto-rate adaptation feature—ensure maximum achievable symmetrical or asymmetrical rates for the installed noise environment, wire gauge/type and length.

Symmetrical line-rate settings are ideal for such applications as remote LAN extension, video teleconferencing, and data backhaul.

Asymmetrical configurations are well-suited for applications requiring higher downstream speeds and/or longer distances between Ethernet devices. Typical asymmetrical scenarios include medical imaging, livestock monitoring, underwater video, internet gaming, and transporting high-resolution IP video from security cameras.

Realize fiber-like speed and distance without the expense of fiber with Patton's ultra-high-speed CopperLink Ethernet Extenders.



Application Example

A built-in, 4-port Ethernet switch makes the CopperLink Model 2174 ideal for delivering multiple IP information streams over a single cable. For example, at a guardhouse or security kiosk, you could aggregate IP data from a laptop, a motion sensor, and two high resolution IP video cameras for simultaneous transmission over a single Ethernet connection.

Combining data flows from up to four network-enabled devices onto a single twisted pair or coax cable, the Model 2174 can deliver IP traffic up to 1.8 miles (3 km) away—well beyond the

standard 328-foot (100-meter) Ethernet distance limitation.

With achievable line rates up to 168 Mbps, the CopperLink 2174 eliminates the bandwidth constraints commonly experienced with other copper-based transmission technologies. The Model 2174 is engineered to re-use existing infrastructure previously employed in legacy applications including alarm circuits, E1/T1 circuits, RS-232, RS-422, RS-485, CCTV and CATV. Many newer cabling standards are also supported, including Cat 5e, Cat 6 and Cat 7.

ORDERING INFORMATION

2174/BNC/EUI-2PK: CopperLink High Speed Ethernet Kit; BNC; 100–240 VAC

2174/EUI-2PK: CopperLink High Speed Ethernet Kit; RJ-45; 100–240 VAC

2174/TB/EUI-2PK: CopperLink High Speed Ethernet Kit; Terminal Block; 100–240 VAC

FEATURES & BENEFITS

- ✓ **Ethernet Extension**—Extend 10/100Base-TX Ethernet well beyond its 328-foot (100-meter) limitation over a single unshielded twisted pair (UTP), Cat 5e/6/7, or even coaxial cable.
- ✓ **Operates Over Twisted Pair**—Realize fiber-optic speeds without the expense—and hassle—of installing new cables or line-of-site wireless circuits.
- ✓ **Plug and Play**—Set these units up straight out of the box. No configuration is required. Auto-sensing 10/100 Ethernet ports support full or half-duplex operation.
- ✓ **Multiple Line Rates Supported**—Switch-selectable rate mode options optimize rate and reach for the noise environment, wire gauge/type and length.
- ✓ **Transparent LAN Bridging**—Bypass network configuration requirements by transparently passing all higher layer protocols—including 802.1Q VLAN frames (tagged and untagged). Data-transmission mechanism is fully transparent to such IP video compression schemes as MPEG-4, H.264 and MJPEG.

Rate and Reach: Long Range Symmetrical

Length feet (m/km)	Mbps	
	Downstream	Upstream
250 (76 m)	68	50
1000 (305 m)	62	44
2000 (610 m)	50	16
3000 (914 m)	33	4
5000 (1.5 km)	16	2
10,000 (3 km)	2.5	1

Rate and Reach: High Speed Asymmetrical

Length feet (m/km)	Mbps	
	Downstream	Upstream
250 (76m)	168	95
1000 (305m)	126	54
2000 (610m)	60	21
3000 (914m)	42	6
3500 (1km)	35	1

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70 Mbps Symmetrical or 100 Mbps Asymmetrical Ethernet Extender

CopperLink™ 2173

With achievable line rates of 70 Mbps symmetrical, or 100 Mbps asymmetrical over a single twisted-pair, the Model 2173 is one of the fastest in the large line of CopperLink™ Ethernet extenders.

The CopperLink™ Model 2173 High Speed Ethernet Extender leverages existing copper infrastructure to deliver high speed Ethernet extension.

Multiple user-selectable settings for symmetrical and asymmetrical rates provide the flexibility required to achieve the optimal speed-distance combination for each and every connection. Multi-rate symmetrical line rates allow each connection to be tuned for the length and gauge of the copper wire, in order to achieve the maximum possible data rate for the environment.

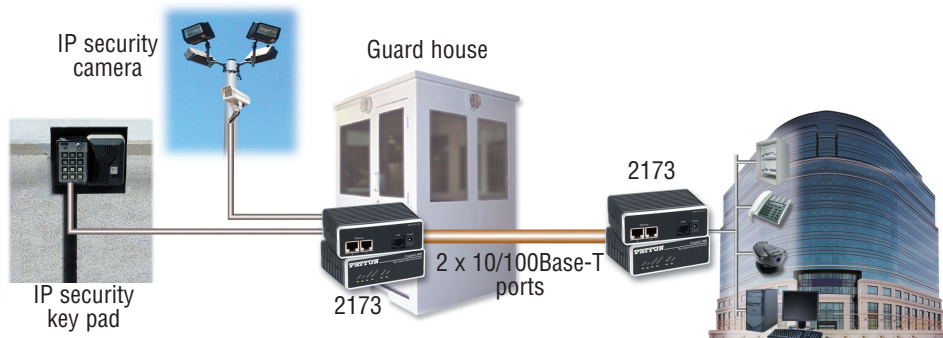
Typical symmetrical applications include remote LAN extension, video teleconferencing, and data backhaul. Asymmetrical line rates are the ideal solution for applications that require longer extension between their Ethernet devices and for applications that primarily involve high downstream requirements. These asymmetrical applications include high resolution IP video for security, medical imaging, livestock monitoring, underwater video, and internet gaming.

Get near-fiber performance without the expense with Patton's High Speed CopperLink Ethernet Extenders.

Application Example

Model 2173 dual-port CopperLink Ethernet Extenders are ideal for delivering high speed IP video and data links to remote devices that are beyond the 328 foot (100 meter) distance limit of Ethernet. The high throughput eliminates bandwidth concerns previously experienced with many other copper based transmission technologies. By utilizing existing voice grade copper pairs, the expense and hassle of installing low capacitance or fiber cabling is no longer required.

Depicted below is a typical application involving multiple network enabled devices (Ethernet) plugged in for simultaneous Ethernet data and IP video delivery.



Distance Chart Based on 24 AWG (0.5 mm)	
Line Rate	Distance in feet (km)
4/1	5,500 ft (1.6 km)
100/70	500 ft (0.15 km)
25/25	2,250 ft (0.6 km)
50/50	1,750 ft (0.5 km)
70/70	1,750 ft (0.5 km)

Note: Actual distance and link performance depends on the environment and type/gauge of wire used.

FEATURES & BENEFITS

- ✓ **Ethernet Extension**—Extends 10/100Base-TX Ethernet up to 4,250 feet over 2-wire 24 AWG twisted pair.
- ✓ **Operates Over Twisted Pair**—Near fiber speeds without the cost of new cable or fiber installations or the hassles of wireless line of site.
- ✓ **Plug and Play**—Modems need no configuration to operate, Ethernet ports are auto-sensing 10/100, full or half duplex.
- ✓ **Multiple Line Rates Supported**—Switch-selectable line rates ensure best possible rate vs. reach combination.
- ✓ **Transparent LAN Bridging**—No network configuration. Will pass higher layer protocols, including 802.1Q VLAN tagged and untagged packets. Fully transparent to various UP video compression schemes such as WMV, MPEG-4 and MJPEG.

Rack, Stack, and Organize up to 10 Patton Devices with Patton's Mounting Panel.



- ✓ Up to 10 independently operating slots prevents single point of failure.
- ✓ Only 4U (7 in./17.78 cm) high, the 1001MP10 fits into any 19-inch rack.
- ✓ Rack-mount Patton products you've already purchased

ORDERING INFORMATION

2173/EUI: CopperLink High Speed Ethernet Extender; RJ-45 Line; 100–240 VAC

2173/EUI-2PK: CopperLink High Speed Ethernet Extender Kit (1 Local and 1 Remote); RJ-45 Line; 100–240 VAC



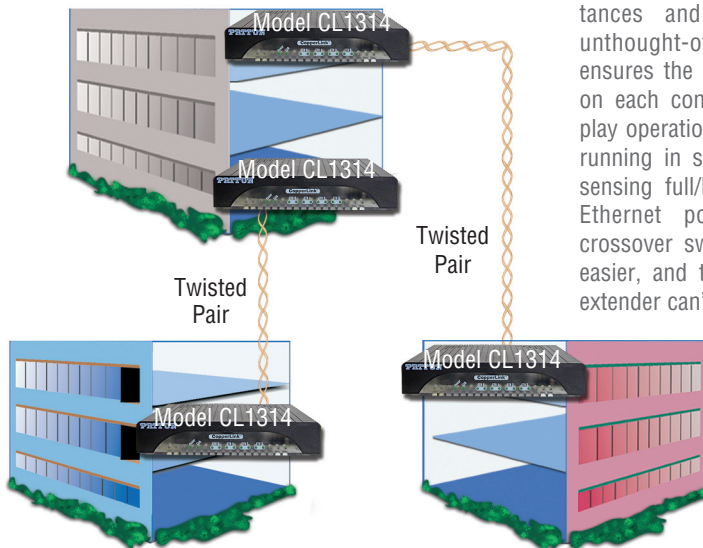
5.7 Mbps High Speed Ethernet Extender with Auto-Rate Adaptation

CopperLink™ 1314

Reach your remote LAN with Patton's Auto-Rate Ethernet Extender and get the best speed/distance combination in the industry using just a single twisted-pair.

Patton's CopperLink Auto-Rate Ethernet Extender is the perfect fit for simple, cost-effective high speed Ethernet extension. It enables customers to take advantage of existing copper infrastructure

to connect remote LANs across distances and at speeds previously unthought-of. The auto-rate feature ensures the highest speed is achieved on each connection, and the plug 'n' play operation ensures they are up and running in seconds. Add in the auto-sensing full/half duplex 10/100Base-T Ethernet port and the integrated crossover switch to make setup even easier, and the value of this Ethernet extender can't be beat!



Application Example—Corporate Campus LAN Extension

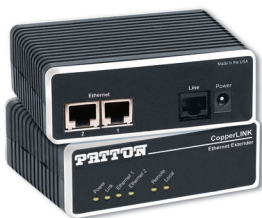
FEATURES & BENEFITS

- ✓ **Auto-rate Selection**—Just plug the units in, and they will determine the maximum rate possible for the connection. Rates are also user configurable.
- ✓ **CopperLink 2-Wire Connection**—Easy 2-wire CopperLink connection via built-in RJ-11 port.
- ✓ **Built-in 4-port Ethernet Switch**—4 x auto 10 or 100Base-T and full or half-duplex Ethernet operational for direct connection of four Ethernet devices.
- ✓ **Transparent LAN Bridging**—Passes higher layer protocols and supports 802.1Q VLAN tagging

Distance Chart Based on 24 AWG (0.5 mm)	
Line Rate	Distance in feet (km)
192 kbps	3.4 miles (5.48 km)
2304 kbps	2.3 miles (3.65 km)
5696 kbps	2 miles (3.35 km)

ORDERING INFORMATION

CL1314/EUI-2PK: CopperLink Long Range Ethernet Extender Kit; 100–240 VAC



15 Mbps Multi-Rate CopperLink™ Ethernet Extender Model 2151

Multi-rate high speed Ethernet extension over voice-grade wire.

Variable symmetric or asymmetric data rates

Line rates can be set on the standalones and rack cards to differentiate services and increase the distance of the individual links.

Distance Chart, Based on 24 AWG (0.5 mm)			
Line Rate	Distance in feet (km)	Line Rate	Distance in feet (km)
4/1	5,500 ft (1.6 km)	6/6	5,500 ft (1.6 km)
9/1	5,750 ft (1.7 km)	10/10	5,000 ft (1.5 km)
16/2	4,700 ft (1.4 km)	15/15	4,250 ft (1.2 km)

Note: Actual distance and link performance depends on the environment and type/gauge of wire used.

ORDERING INFORMATION

2151/EUI: CopperLink 15 Mbps Ethernet Extender; RJ-45 Line; 100–240 VAC

2151/EUI-2PK: CopperLink 15 Mbps Ethernet Extender Kit; RJ-45 Line; 100–240 VAC

FEATURES & BENEFITS

- ✓ **Ethernet Extension**—Extends 10/100 Base-TX Ethernet distances 1 mile using 2-wire 24 AWG unconditioned lines
- ✓ **Seamlessly Connect and Extend the LAN**—802.3 10/100Base-TX LAN connection via built-in shielded RJ-45 port
- ✓ **CopperLink 2-Wire Connection**—Easy 2-wire connection via built-in RJ-45 port or terminal block
- ✓ **Switch Selectable**—Asymmetrical or Symmetrical line rates up to 15 Mbps!
- ✓ **Dual Auto-sensing Ethernet**—Auto 10 or 100Base-T and full or half-duplex Ethernet operation

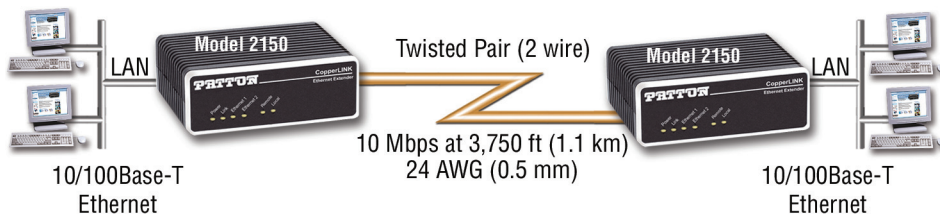


10 Mbps Multi-Rate Ethernet Extender CopperLink™ 2150

Overcome the distance limitations of Ethernet with the Patton Model 2150 CopperLink™ Ethernet Extender. Using a single twisted-pair of voice-grade wire, transparently extend the reach of your network to over 3,750 ft (1.1 km) at 10 Mbps symmetric.

These multi-rate Ethernet Extenders are ideal for bridging Ethernet spans inside buildings that are beyond the 328-foot (100-meter) distance limit of Ethernet.

For example, connecting remote LANs located on different floors in a building over already existing telephone-grade twisted pair.



Distance Chart

Based on 24 AWG (0.5 mm)

Line Rate	Distance in feet (km)
10/10	4,500 ft (1.3 km)
10/10	4,500 ft (1.3 km)
10/10	4,750 ft (1.4 km)
10/10	5,000 ft (1.5 km)

Note: Actual distance and link performance depends on the environment and type/gauge of wire used.

FEATURES & BENEFITS

- ✓ **Long-reach High Speed Ethernet Extension**—Overcome the 328 ft (100 m) limitation of Ethernet with a full-duplex 10 Mbps link at distances up to 3,750 ft (1.1 km)
- ✓ **Seamlessly Connect and Extend the LAN**—802.3 10/100Base-T LAN connection via built-in shielded RJ-45 port
- ✓ **CopperLink 2-Wire Connection**—Easy 2-wire CopperLink connection via built-in RJ-45 port or optional terminal block
- ✓ **Dual Auto-sensing Full-Duplex Ethernet**—Auto 10 or 100Base-T and full or half-duplex Ethernet operation
- ✓ **Transparent LAN Bridging**—Passes higher layer protocols and supports 802.1Q VLAN tagging
- ✓ **Automatic Learning, Aging, and Filtering**—Only allows packets with addresses outside the LAN to be forwarded

ORDERING INFORMATION

2150/EUI: CopperLink 10 Mbps Ethernet Extender; RJ-45 Line; 100–240 VAC

2150/EUI-2PK: CopperLink 10 Mbps Ethernet Extender Kit (1 Local Unit and 1 Remote Unit); RJ-45 Line; 100–240 VAC

Reach Farther. Faster. COPPERLINK™ ETHERNET EXTENDERS

FEATURES

- ✓ Extends Ethernet 600m–5km
- ✓ Operates over twisted pair
- ✓ No configuration required
- ✓ Supports multiple line rates
- ✓ Transparent LAN bridging



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45 Mbps Long Range Ethernet Extender CopperLink™ 2160 Series

With rates up to 45 Mbps and reach up to 24,000 feet (7,315 meters), the Patton Model 2160 is the most versatile Ethernet Extender offered today.

The Patton CopperLink Model 2160 Series simplifies and provides cost effective network extension by utilizing pre-existing twisted pair infrastructure. Patton's Model 2160 series of auto-rate Ethernet Extenders open the door to low-cost and easy set-up LAN extension.

There are three models available in the 2160 series, including the flagship Model 2162 that utilizes 1 to 4 pair of voice grade wires enabling maximum transmission speeds of 22.8 Mbps at a distance of 1.6 miles (2.6 km). Also available is the Model 2161 (4 wire)—11.4 at 1.6 miles (2.6 km), and the Model 2160—5.7 Mbps at 1.6 miles (2.6 km). Maximum distance achieved with all CopperLink 2160 models is 4.1 miles (6.6 km).

FEATURES & BENEFITS

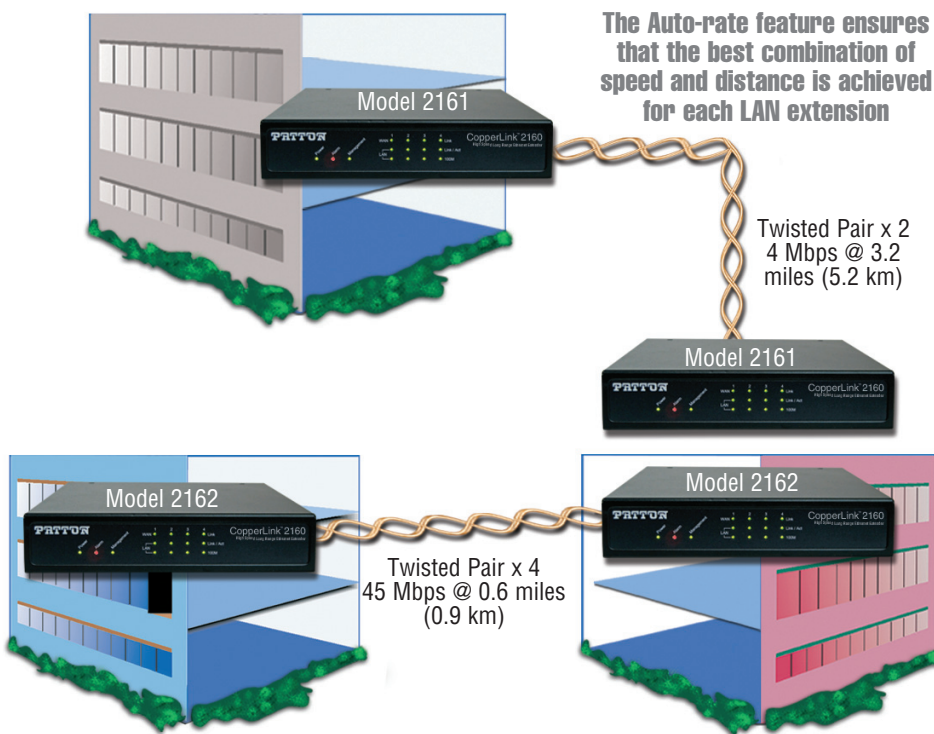
- ✓ **Line Rates up to 45 Mbps**—Get reliable broadband connectivity with full-duplex symmetric rates and distances exceeding 4.5 miles (7,300m)
- ✓ **4 x 10/100 Ethernet Switch**—Make up to 4 network connections easily. Built in MDI-X auto cross over switches eliminates messy and confusing cable configurations.
- ✓ **Transparent LAN Bridging**—Passes higher layer protocols and supports 802.1Q VLAN tagging
- ✓ **Automatic Learning, Aging and Filtering**—Only allows packets with addresses outside the LAN to be forwarded.
- ✓ **QoS, CoS, and VLAN Support**—Ensure mission critical network connections are of top quality with advanced traffic management features.
- ✓ **WWW/SNMP Manageable**—Built-in console port makes setup a snap, you can also use the embedded HTTP/SNMP agent to remote manage the unit from anywhere in the world.

ORDERING INFORMATION

2160/EUI-2PK: CopperLink High Speed, Long Range Ethernet Extender Kit (1 pair), 5.7 Mbps; 100–240 VAC

2161/EUI-2PK: CopperLink High Speed, Long Range Ethernet Extender Kit (2 pair), 11.4 Mbps; 100–240 VAC

2162/EUI-2PK: CopperLink High Speed, Long Range Ethernet Extender Kit (4 pair), 22.8 Mbps; 100–240 VAC



Distance Chart, 2160 Series

2-Wire Standard			2-Wire High Speed		
Line rate	24 AWG (0.5 mm)		Line rate	24 AWG (0.5 mm)	
kbps	miles	km	kbps	miles	km
192	5.2	8.3	384	2.0	3.2
512	4.2	6.7	1024	1.6	2.6
1024	3.8	6.2	2048	1.4	2.3
1536	3.5	5.6	3072	1.3	2.1
2048	3.2	5.2	4096	1.2	2.0
5696	2.0	3.3	11392	0.9	1.4

Distance Chart 2161 Series

2-Wire Standard			2-Wire High Speed		
Line rate	24 AWG (0.5 mm)		Line rate	24 AWG (0.5 mm)	
kbps	miles	km	kbps	miles	km
384	5.2	8.3	768	2.0	3.2
1024	4.2	6.7	2048	1.6	2.6
2048	3.8	6.2	4096	1.4	2.3
3072	3.5	5.6	6144	1.3	2.1
4096	3.2	5.2	8192	1.2	2.0
11392	2.0	3.3	22784	0.9	1.4

Distance Chart 2162 Series

2-Wire Standard			2-Wire High Speed		
Line rate	24 AWG (0.5 mm)		Line rate	24 AWG (0.5 mm)	
kbps	miles	km	kbps	miles	km
768	5.2	8.3	1536	2.0	3.2
2048	4.2	6.7	4096	1.6	2.6
4096	3.8	6.2	8192	1.4	2.3
6144	3.5	5.6	12288	1.3	2.1
8192	3.2	5.2	16384	1.2	2.0
22784	2.0	3.3	45568	0.9	1.4

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CopperLink™ Wall Mounted Ethernet Extenders

Max. Distance	Max. Speed	Distance at Max. Speed	Temperature Range	Model
1 mile (1.6 km)	50 Mbps	800 feet (243.9 m)	-10 to 70°C	CopperLink™ 2173R
1 mile (1.6 km)	50 Mbps	800 feet (243.9 m)	-40 to 85°C	CopperLink™ 2173R/CC
5.7 miles (9.2 km)	4.6 Mbps	2.0 miles (3.2 km)	-40 to 85°C	CopperLink™ 1314R



50 Mbps Wall Mountable Ethernet Extender

CopperLink™ 2173R

Patton's CopperLink 2173R extends Ethernet connections at distances up to 5,500 feet (1,676 meters) over already existing infrastructure cabling. It reduces the cost and hassles of new installations, utilizing installed voice-grade twisted pairs to eliminate the expense of fiber or Cat5e cabling.

FEATURES & BENEFITS

- ✓ **Full-duplex data-line rate of 100 Mbps**—Provides near fiber performance for bandwidth intensive applications such as Triple Play services.
- ✓ **Plug and Play**—No configuration or cable hassles during installation with auto-sensing 10/100, full or half duplex, and auto MDI-X.
- ✓ **Flexible installation**—Wall mount ready and optional DIN rail kit
- ✓ **Extended temperature**—From -40 to 85°C

Model 2173R Distance Chart
Based on 24 AWG (0.5 mm)

Line Rate	Distance
4/1	5,500 ft (1.6 km)
100/70	250 ft (0.07 km)
25/25	2,250 ft (0.6 km)
50/50	1,750 ft (0.5 km)
70/70	1,750 ft (0.5 km)

ORDERING INFORMATION

2173R/EUI: Ruggedized CopperLink High Speed 50 Mbps CopperLink Ethernet Extender; -10 to 70°C; RJ-45 Line; External 100–240 VAC Adapter

2173R/EUI-2PK: Ruggedized CopperLink High Speed 50 Mbps CopperLink Ethernet Extender Kit; -10 to 70°C; RJ-45 Line; External 100–240 VAC Adapter

2173R/CC/EUI: Conformal Coated and Ruggedized CopperLink High Speed 50 Mbps Ethernet Extender; -40 to 85°C; RJ-45 Line; 100–240 VAC



5.7 Mbps DIN Rail Mountable Ethernet Extender

CopperLink™ 1314R

Reach your remote LAN with Patton's Auto-Rate Ethernet Extender and get the best speed/distance combination in the industry using just a single twisted-pair.

Let the Patton Model 1314R simplify network extension by using twisted-pair infrastructure previously used for such legacy systems as TTL, RS-232 and RS-422/485 to be used for extending or connecting Ethernet devices together.

A pair of 1314Rs or a 1314R combined with a 1314 desktop unit can extend network connections up to 18,000 ft (5.48 km).



FEATURES & BENEFITS

- ✓ **High Speed Extension**—With the Model CL1314R you get speeds up to 5.7 Mbps.
- ✓ **Auto-rate Selection**—Just plug the units in, and they will determine the maximum rate possible for the connection. Rates are also user configurable.
- ✓ **CopperLink 2-Wire Connection**—Easy 2-wire CopperLink connection via built-in RJ-11 port.
- ✓ **Built-in 4-port Ethernet Switch**—4 x auto 10 or 100Base-T and full or half-duplex Ethernet operational for direct connection of four Ethernet devices.
- ✓ **Transparent LAN Bridging**—Passes higher layer protocols and supports 802.1Q VLAN tagging
- ✓ **Automatic Learning, Aging, and Filtering**—Only allows packets with addresses outside the LAN to be forwarded

Distance Chart

Based on 24 AWG (0.5 mm)

Line Rate	Distance in feet (km)
192 kbps	3.4 miles (5.48 km)
2304 kbps	2.3 miles (3.65 km)
5696 kbps	2 miles (3.35 km)

ORDERING INFORMATION

Call for details.

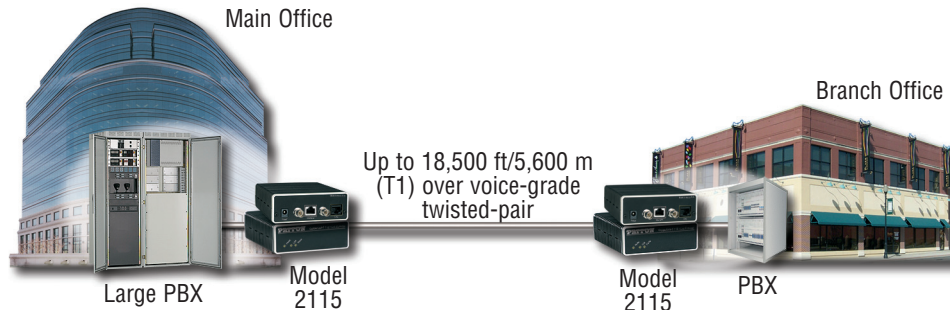
CopperLink™-T T1/E1 Ethernet Extenders

Distance at 24 AWG	Signaling Standard	Model
2.8 miles (4.6 km)	T1	CopperLink™-T 2115
2.5 miles (4.0 km)	E1	CopperLink™-T 2113A



T1 Extender CopperLink™-T 2115

The CopperLink™-T 2115 is a transparent, plug-and-play T1 Extender that solves the distance and wire limitations of TDM technology by tripling the reach to over 3 miles over a single pair of wires.



FEATURES & BENEFITS

- ✓ **Voice and Data Extension**—The T1/E1 Extenders operate in clear channel mode allowing the transparent passing of both voice and data.
- ✓ **Plug and Play**—Plug them in and the link comes up in seconds. The line interface is even polarity insensitive, making it easier to get running.
- ✓ **Line Tests**—V.52 511/511E Pattern Generator with Remote Digital Loopback (RDL); Local Analog Loopback (LAL).

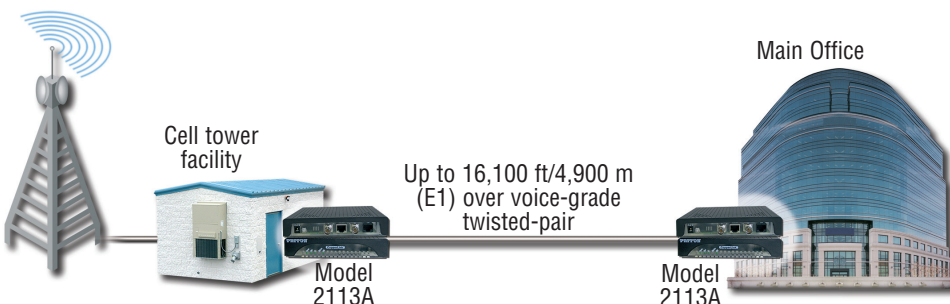


E1 Extender CopperLink™ 2113A

The CopperLink™ 2113A is a transparent, plug-and-play E1 Extender that solves the distance and wire limitations of TDM technology by tripling the reach and halving the number of required wire pairs.

With the CopperLink™ 2113A extender, zero configuration is required. They operate in clear-channel mode, thereby facilitating the transparent extension of data and voice bearing circuits. The two active pins on the RJ connector are polarity insensitive, so you don't even need to worry about which wire you connect on the line interface. Simply take them out of the box, put them on either side of the dry copper pair, connect your E1 device and the circuit will light up immediately!

The Model 2113A extends E1 circuits to 16,100 feet (4,900 meters, nearly 5 km). The 2113A requires only two wires (one pair) to extend the TDM circuits, thereby conserving and minimizing the copper plant resources used.



FEATURES & BENEFITS

- ✓ **Triple the Distance**—Extend E1s to nearly 5 km over one pair of wires.
- ✓ **Half the Wires**—The E1 extender only needs one pair of wires to operate.
- ✓ **Voice and Data Extension**—The E1 Extender operates in clear channel mode allowing the transparent passing of voice and data.
- ✓ **Plug and Play**—Plug the 2113A in and the link comes up in seconds. The line interface is even polarity insensitive, making it easier to get running.
- ✓ **Line Tests**—V.52 511/511E Pattern Generator with Remote Digital Loopback (RDL); Local Analog Loopback (LAL).
- ✓ **Front Panel Status Indicators**—Front panel LEDs provide users with quick feedback on unit operation.

ORDERING INFORMATION

2115/EUI-2PK: CopperLink T1 Extender Kit; 100–240 VAC

2113A/EUI-2PK: CopperLink E1 Extender Kit; 100–240 VAC

CopperLink™ EnviroNET™ Ethernet Extender Solutions

Sample solutions



- Each EnviroNET product is customized to your requirements
- Various NEMA, IP (ingress protection), and MIL-SPEC options are available

Contact: sales@patton.com for details.



EnviroNET™ Ethernet Extenders provide transparent extension of your 10/100 Ethernet LANs at distances up to 8 km over a single twisted pair or line rates over 100 Mbps!

EnviroNET™ Ethernet Extenders are housed in protective enclosures and operate in extreme temperatures, ranging from -40 to 85°C. Each EnviroNET extender is customized to your requirements. So whether you are looking for

protection from vandalism or extending Ethernet to locations where harsh environmental elements such as heating, cooling, dust, and moisture cannot be controlled, there is an EnviroNET solution that is right for you.

EnviroNET™ Ethernet Extender applications include closets, ceilings, industrial automation, roadside cabinets, and various outdoor installations such as security and transportation access/control/surveillance.

Extend your Ethernet Farther and Faster

CopperLink Model	Max Speed (Mbps)	Distance at Max Speed
2174	168	76 m
2173	100	150 m
2162	45	1.4 km

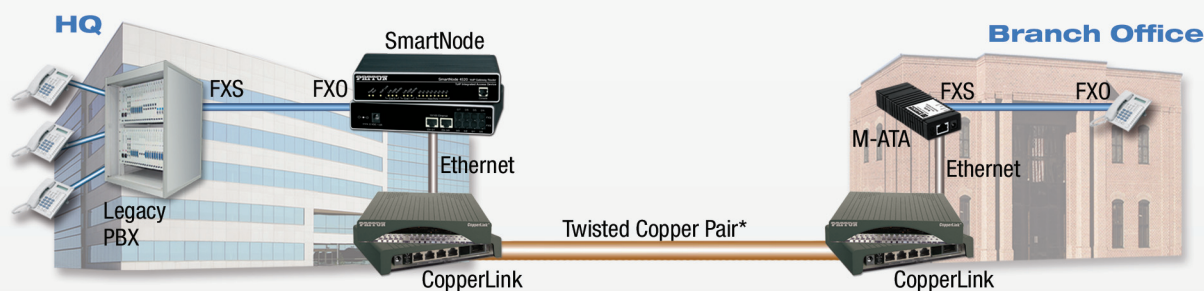
Utilize existing copper lines to extend your LAN up to 8 km with CopperLink™

Extend analog extensions beyond normal distance with combinations of SmartNode and CopperLink

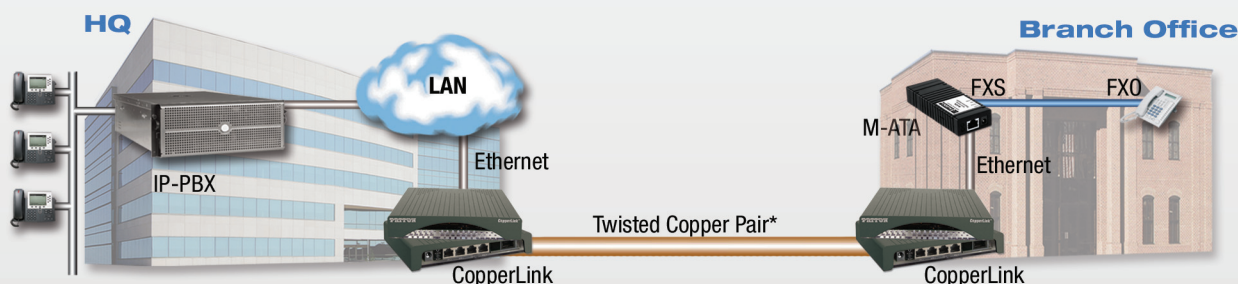
Use analog and IP cameras for vigilant monitoring without the barrier of distance

CopperLink Model	LAN Ports	No. of Wires	Max Speed in Mbps	Distance at Max Speed	Max Distance
2174	4	2	168 Downstream	0.76 km	3 km
2173	2	2	100 Downstream	0.15 km	1.3 km
2160 Series	4	2 to 8	11.4 per pair	3.35 km	8.3 km
2151	2	2	15	1 km	1 km
2150	2	2	10	1.1 km	1.1 km
CL1314	4	2	5.7	3.35 km	8.3 km

Try a Patton CopperLink & SmartNode solution for extending analog extensions to remote locations**



Try a Patton CopperLink for extending IP voice**



** Shown using CopperLink and SmartNode devices

* Up to 8 km on 0.5 mm wire (or beyond using thicker copper wire)

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